

**REMARKS**

This is in response to the non-final Official Action currently outstanding with respect to the above-identified application.

Claims 1-8 were present in this application as of the time of the issuance of the currently outstanding Official Action. By the foregoing Amendment, Claims 1-6 have been amended and New Claims 9-11 have been added. No claims have been canceled. Accordingly, upon the entry of the foregoing Amendment, Claims 1-11 will constitute the claims under active prosecution in this application.

The Claims as they will stand upon the entry of this Amendment as set forth above as required by the Rules.

More specifically, it is noted that in the currently outstanding Official Action, the Examiner has:

1. Acknowledged Applicants' claim for foreign priority under 35 USC 119(a)-(d) or (f), and indicated that the required certified copies of the priority document have been received by the United States Patent and Trademark Office.
2. Provided Applicants with a copy of a Notice of References Cited (Form PTO-892) and copies of the references cited therein.
3. Acknowledged Applicants' Information Disclosure Statement by providing Applicants with a copy of the Form PTO-1449 that accompanied that Statement duly signed, dated and initialed by the Examiner to confirm his consideration of the art disclosed therein;

4. Objected to the drawings under 37 CFR 1.83(a) as not showing every feature specified in the claims and required Applicants to submit a proposed drawing change or corrected drawings in response to the currently outstanding Official Action.
5. Rejected Claims 1-8 under 35 USC 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter that Applicants regard as their invention.
6. Rejected Claims 1-8 under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.
7. Rejected Claims 2, 4, 6 and 8 under 35 USC 102(b) as being anticipated by the Kamei, et al. reference (U.S. Patent 5,640,174).
8. Rejected Claim 1, 3, 5 and 7 under 35 USC 103(a) as being unpatentable over the Kamei, et al reference as applied to Claims 2, 4, 6 and 8 and further in view of the Nitta, et al. reference (U.S. Patent 6,275,207 B1).
9. Cited certain additional art as pertinent to Applicants' disclosure, but failed to apply that art against any of the presently pending claims of this application.

Further comment in these Remarks regarding items 1-3 and 9 above is not considered to be necessary in these Remarks.

With respect to items 4-6, the objection to the drawings and the rejections under 35 USC 112, the Examiner alleges that the following two passages found in the claims (i) are not shown in the drawings as filed, (ii) are indefinite for failing to particularly point out and distinctly claim the present invention, and (iii) are insufficient to enable one skilled in the art to make and/or use the invention:

Passage 1:

"positive-side (high level) voltage resistance division ratios and negative-side (low level) voltage resistance division ratios are set so as to be asymmetrical with one another depending upon level shift characteristics"

Passage 2:

"resistance division ratios are optimized depending upon gray scale characteristics"

By the foregoing amendment, Applicants have amended Claims 1 and 2 in a manner that is respectfully submitted to remove the bases for the Examiner's objection to the drawings and rejections of the claims under 35 USC 112, first and second paragraphs.

In particular, turning first to the Examiner's assertions that the foregoing passages are not clear and that they also do not enable one skilled in the art to make and/or use the invention, the Examiner suggests in the currently outstanding Official Action that the specification does not explain how the positive-side (high level) voltage resistance division ratios and negative-side voltage resistance division ratios are set so as to be asymmetrical with one another depending on level shift characteristics. As examples of this, the Examiner indicates that in that the specification (i) does not contain the details of whether or not the series resistors are variable or fixed to predetermined values, (ii) specify what the relationship between the resistance values and the voltage resistance ratios are, and (iii) does not contain the details of how the resistance division ratios are optimized depending upon gray scale display characteristics.

The Examiner, however, apparently has forgotten (or not noticed) that the present specification clearly indicates that ***the various gray scale voltages generated by the source driver are to be set to conform to a target gray scale display characteristic*** (i.e., a characteristic relationship between an applied display signal input and the resulting display characteristics). Thus, it is not possible to specify all of the various specific voltage inputs and/or specific resistor values and/or specific resultant gray scale output voltages contemplated. Instead, the present invention contemplates that the source driver is to contain a resistance-type voltage division circuit that receives at least one positive side reference voltage input and at least one negative side voltage level input and evidences positive-side voltage resistance division ratios and the negative-side voltage resistance division ratios at the respective resistor junctions that are set respectively to correspond to a particular target gray scale characteristic so that an appropriate gray scale voltage may be selected corresponding to input display data to the pixels being driven.

Thus, in the examples discussed in the specification a positive-side voltage resistance ratio at a particular selected one of the resistance junctions or a negative-side voltage resistance ratio at a particular selected one of the resistance junctions of the voltage division circuit within the source driver determine a gray scale voltage output corresponding to a particular one of the levels of a 64-level gray scale display that may be selected by the source driver according to the input data signal. The actual voltage and resistance values will vary depending upon the particular situation. It is to be understood, however, that both the positive-side voltage resistance ratio and the negative-side voltage resistance ratio at the respective resistance junctions in the resistance-type voltage division circuit are readily determinable by those skilled in the art in each particular situation due to the assumed knowledge of the prior art by such individuals along with the teachings of the present specification.

The foregoing is clear from the present specification (see, page 8, lines 2-8; page 17, lines 14-22; page 20, last paragraph; and page 32, line 8 to page 33, line 4). In addition, a representative relationship of the positive-side voltage resistance ratio and the negative-side voltage resistance ratio is clearly depicted in Fig. 4.

Stated slightly differently, one of ordinary skill in the art at the time the present invention was made would surely have known how to adjust the input voltages to, and the various resistances values present in, a resistance-type voltage division circuit in such a way that the voltages at the respective resistance junctions are set at values resulting in the target display characteristics of the gray scale levels generated and displayed by the pixels of the display in response to data input values being achieved. This is repeatedly explained in the present specification as what is required for "optimum" results. The foregoing amendment clarifies this while at the same time removing the word "optimum" that the Examiner indicates to be ambiguous in nature from the phraseology of the claims.

Accordingly, the basis of the Examiner's objection to the drawings is simply in error, and is respectfully traversed. The features of the claims questioned by the Examiner as not being shown in the drawings in fact are clearly shown in the drawings as filed just as they are fully discussed in the specification. In particular, reference to Figure 4 (which is a graph showing positive-side gray scale voltage vs. resistance and negative-side gray scale voltage vs. resistance) clearly shows that the relationship of the positive-side voltage resistance ratios to the negative-side voltage resistance ratios is asymmetrical when the shift level characteristic is corrected as specifically described in the paragraph bridging pages 27 and 28 of the present specification. As discussed above, the lack of specific values is not a justifiable basis for the Examiner's objection to the drawings as not showing the invention being claimed. Similarly, the optimum configuration (now amended to adopt the perhaps less ambiguous "target gray scale" criteria) clearly is shown in numerous of the drawings, see for example, Figs. 3-6 and 12-13.

Accordingly, Applicants respectfully submit that they have disclosed and shown the elements of the present invention in the specification and drawings of this application in a clear, definite and appropriate manner. In this regard, Applicants recognize that excessive experimentation cannot be required of a person skilled in the art who desires to practice the invention in light of its disclosure. Nevertheless, it is respectfully submitted that Applicants are entitled to assume that the person of ordinary skill in the art given the known gray scale levels desired in any particular context and the peculiarities of the display device involved will have little difficulty in setting the resistance values of the resistance-type voltage division circuit correctly, and otherwise will clearly understand and be able to make and/or use the invention in light of the specification and drawing currently on file. Consequently, decisions withdrawing both the Examiner's outstanding objections to the drawings and the Examiner's rejections under 35 USC 112, first and second paragraphs, in response to this communication are respectfully requested.

With respect to the Examiner's rejections under 35 USC 102(b) and 35 USC 103(a), Applicants now have amended Claims 1-6 directly and claims 7-8 indirectly in a manner that is believed to more clearly state the subject matter that the Applicants regard as their invention. Further, New Claims 9-11 further clarify the scope of the present invention. In view of these amendments, Applicants respectfully submit that there can be absolutely no doubt that the claims of this application are neither anticipated by, nor obvious in view of, the Kamei, et al. and Nitta, et al references as suggested by the Examiner in the currently outstanding Official Action.

In the latter regard, the Examiner's attention is respectfully directed to Figs. 11-15b and pages 7-15 of the present specification respectively wherein prior art circuits having source drivers with internal resistance-type voltage division circuits that equally divide input gray scale reference voltages are described. The Kamei, et al type circuit wherein a gray scale voltage generation circuit for supplying gray scale voltages to a source driver is provided outside of the source driver also is described in the background section of this application.

Accordingly, Applicants already have made of record in this prosecution the facts that in the Kamei, et al type resistance-type voltage division circuit, that is **external of** the source driver rather than being an **internal** part thereof, the circuit becomes more and more impractical as the number of gray scale levels in the target gray scale characteristic increases. The reasons for this include size considerations, production cost, power consumption and resistor accuracy achievable with standard components.

In addition, even if resistor accuracy itself was not a severe problem, the formation of the Kamei, et al type circuit outside of the source driver suffers from increasing instability as the number of gray scale levels in the target gray scale characteristic increases because of external factors such as noise from surrounding components disrupts the small voltage gradations between the gray scale level voltages being generated for use in the output display. These problems are avoided in the present invention, however, because the resistance-type voltage division circuitry located internally of the source driver is uniquely established so as to divide input reference voltages asymmetrically without the need to provide large scale voltage division components external to the source driver including the capability of providing alternating reference voltages to the mid-point of the division circuit. Instead, the present invention accomplishes all of the theoretical benefits of a Kamei et al type circuit internally of the source driver and in a less complex, cheaper and smaller manner.

Further, the Nitta, et al reference does not alter the foregoing even if the Examiner is correct in his derivation of resistance ratios from voltage ratios in the context of the Kamei et al circuit in view of the Nitta, et al disclosure. By this it is meant that the prior art teaches either that the source driver may contain a resistance-type voltage division capability wherein all of the resistors are equal to one another and such asymmetry as is present arises from asymmetry in the reference voltages provided to the internal resistance-type voltage division circuit; or a Kamei et al type circuit wherein an **external** resistance-type voltage division circuit is provided that supplies the desired gray scale voltages for each of the target gray scale levels to the source driver.



The former of these alternatives is inaccurate and the latter is impractical for gray scale characteristics having a large number of gray scale levels. Hence, the present invention, wherein the internal resistance-type voltage division circuitry is capable of providing all of the required gray scale voltage levels for the target gray scale characteristic with either no, or at least a smaller than otherwise, gray scale reference voltage generator represents a significant, unique and novel advance in the art.

Consequently, for each and all of the foregoing reasons, it is respectfully submitted (i) that the Examiner's analysis of the cited art is in error as he has applied it to the present claims, (ii) that upon reconsideration the Examiner will agree that his present rejections should be withdrawn for the reasons herein stated, and (iii) that the claims of this application as they will stand upon the entry of the foregoing Amendment are in condition for allowance. Reconsideration of this application and the allowance of Claims 1-11 of this application in response to this communication, therefore, are respectfully requested.

Finally, Applicants believe that additional fees are not required in connection with the consideration of this response to the currently outstanding Official Action. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge and/or credit Deposit Account No. **04-1105**, as necessary, for the correct payment of all fees which may be due in connection with the filing and consideration of this communication.

Respectfully submitted,

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